

5 WHAT IS CLAIMED IS:

1. An electrode for attachment to a subject during a defibrillation procedure, comprising:

a conductive member having an outer surface; and

10 a therapeutic agent disposed in surface contact with a subject undergoing the defibrillation procedure and in electrical contact with the conductive member, whereby transport of the therapeutic agent to the subject is enhanced by application of electrical energy
15 to the conductive member.

2. An electrode according to claim 1, wherein the therapeutic agent is selected from the group consisting of epinephrine, adenosine, bretylium,
20 atropine sulfate and lidocaine.

3. An electrode according to claim 1, further comprising a gel layer covering at least a portion of the outer surface of the conductor, wherein the
25 therapeutic agent is disposed in the gel layer.

5 4. An electrode according to claim 1, wherein
the conductive member receives electrical energy at a
level sufficient to induce at least one of
electroporation and electromotion.

10 5. An electrode for attachment to a subject
during a defibrillation procedure, comprising:
 a first conductive member having an outer surface;
 a second conductive member having an outer surface
and being electrically isolated from the first
15 conductive member;
 means for connecting the first conductive member
to the subject;
 means for connecting the second conductive member
to the subject; and
20 a therapeutic agent in surface contact with the
subject undergoing a defibrillation procedure and in
electrical contact with the second conductive member,
whereby transport of the therapeutic agent is enhanced
by application of electrical energy to the second
25 electrode.

5 6. An electrode according to claim 5, wherein
the first and second conductive members are carried by
a single non-conductive substrate.

 7. An electrode according to claim 6, wherein
10 the first and second conductive members are
substantially coplanar.

 8. An electrode according to claim 5, wherein
the therapeutic agent is a drug selected from the group
15 consisting of epinephrine and lidocaine.

 9. An electrode according to claim 5, wherein
the means for attaching the first and second conductive
members includes, respectively, first and second gel
20 layers which are electrically conductive, each having
an inner surface connected respectively to the first
and second conductive members.

 10. An electrode according to claim 5, wherein
25 the second conductive member receives electrical energy

5 at a level sufficient to induce at least one of
electroporation and electromotion.

11. A defibrillation apparatus, comprising:
a power supply;
10 a control circuit connected to the power supply;
first and second electrodes electrically
connectable to the power supply through the control
circuit, and being connectable to a subject undergoing
a defibrillation operation; and
15 a therapeutic agent in electrical contact with at
least one of the first and second electrodes, the at
least one electrode being electrically powered at a
level sufficient to enhance transport of the
therapeutic agent to the subject.
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12. A defibrillation apparatus according to claim
11, wherein each electrode includes a conductive member
having first and second opposite side surfaces, and a
non-conductive backing connected to the first surface
25 of the conductive member.

5 13. An defibrillation apparatus according to
claim 11, wherein the first and second electrodes
includes a gel layer, and therapeutic agent is carried
by the gel layer of at least one of the electrodes.

10 14. A defibrillation apparatus according to claim
11, wherein the first and second conductive member
receive electrical energy at a level sufficient to
induce at least one of electroporation and
electromotion.

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 15. A defibrillation apparatus according to claim
11, wherein the therapeutic agent is a drug selected
from the group consisting of epinephrine and lidocaine.

20 16. A defibrillation apparatus according to claim
12, wherein the therapeutic agent is carried by an
electrically conductive gel layer connected to one of
the first and second conductive members.

25 17. A defibrillation apparatus according to claim
11, wherein the power supply delivers a voltage to the

5 first and second electrodes in a range of about 30 to
2,500 volts for a time between about 0.5 milliseconds
and 5 seconds, the voltage being sufficient to impart
transdermal delivery of the drug and to deliver a
defibrillation shock to the patient.

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18. A defibrillation apparatus according to claim
11, wherein the power supply delivers a voltage to the
electrodes in a range of about 0 to 40 volts for a time
between about 0.1 seconds and 30 minutes, the voltage
15 being sufficient to enhance the transdermal delivery of
the drug via electromotive force.

19. A method of treating a patient comprising the
steps of:

20 placing at least two electrodes in surface contact
with a subject;

placing a therapeutic agent in surface contact
with the subject and in electrical contact with at
least one of the two electrodes;

25 electrically connecting the at least two
electrodes to a voltage source;

5 supplying a voltage to the subject through the at
least two electrodes for a time and at a level
sufficient to enhance transdermal delivery of the
therapeutic agent to the subject.

10 20. A method according to claim 18 wherein the
therapeutic agent includes an active agent selected
from the group consisting of lidocaine and epinephrine.

21. A method according to claim 18, wherein the
15 step of supplying a voltage comprises supplying a
voltage in a range of about 0 to 50 volts for a time
between about 0.12 seconds and 30 minutes.

22. A method according to claim 18, wherein
20 before supplying a voltage through the two electrodes,
supplying a voltage in a range of about 30 to 2,500
volts for a time between about 0.5 milliseconds and 5
seconds, said voltage being sufficient to impart a
defibrillation shock.

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23. A defibrillation apparatus comprising:

5 a base unit including a power supply;
 a first defibrillation electrode connectable to
the power supply;
 a second defibrillation electrode connectable to
the power supply;
10 a drug delivery electrode connectable to the power
supply; and
 a control circuit for selectively connecting the
power supply to the first, second and third electrodes
to deliver electric energy at a level sufficient to
15 defibrillate a subject and to impart transdermal
delivery of a drug to the subject.

24. A defibrillation apparatus according to claim
23, wherein the power supply includes a first power
20 supply connected between the first and second
defibrillation electrodes, and a second power supply
connected between one of the first and second
defibrillation electrodes and the drug delivery
electrode.

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